

Lab 3 - NAT Pool

Lab 3: NAT lab — NAT pool

The physical topology is as shown in Figure 14–3.

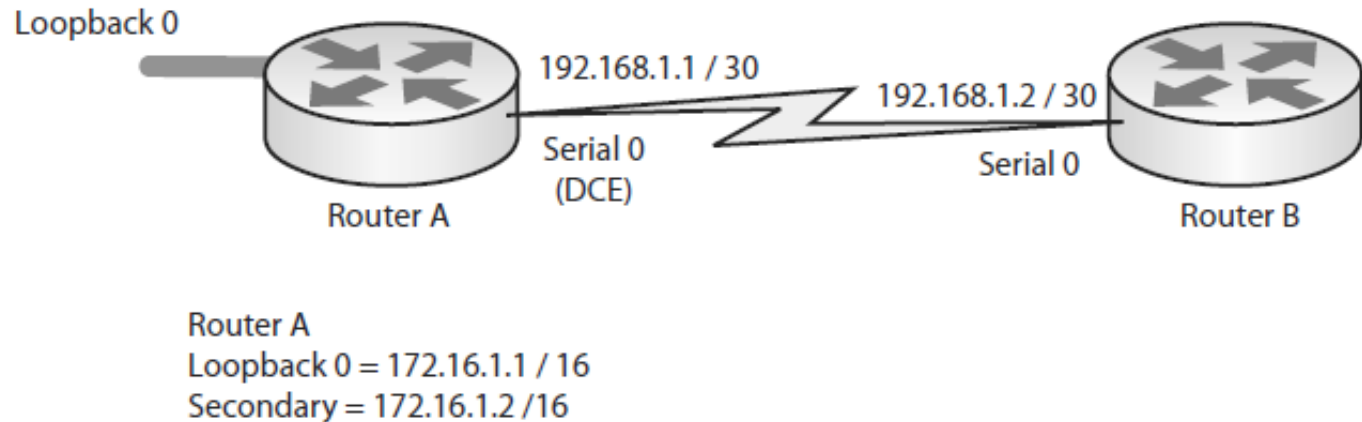


Figure 14–3: NAT pool

Lab exercise

Your task is to configure the network in Figure 14–3 to allow the hosts on the 172.16.0.0 LAN (we will simulate this with the loopback address and secondary address) to access the

Internet'sing the NAT pool 10.0.0.1 to 10.0.0.10. Please feel free to try the lab without following the lab walk-through section.

Purpose

Being able to configure NAT is a fundamental CCNA skill. Any client who needs to access the Internet will want to use NAT. The key is to understand the client's requirements and then design a solution to fit his/her needs.

Lab objectives

1. Use the IP addressing scheme depicted in Figure 14–3. Router A needs a clock rate on interface serial 0: set this to 64000.
2. Set telnet access for the router to use the local login permissions of username “banbury” and the password “ccna” (optional).
3. Put a static route on the router.
4. Configure the inside and outside NAT interfaces on the router.
5. Configure a pool of addresses the router will use as a NAT pool.
6. Test the NAT config with a ping and debug.

Lab walk-through

1. To set the IP addresses for an interface, you will need to do the following:

```
Router#config t
Router(config)#hostname RouterA
RouterA(config)#
RouterA(config)#interface serial 0
RouterA(config-if)#ip address 192.168.1.1 255.255.255.252
RouterA(config-if)#clock rate 64000 « If this is the DCE side
RouterA(config-if)#no shutdown
RouterA(config-if)#ip nat outside « The outside NAT network
RouterA(config-if)#interface loopback 0 « No need for “no shutdown” on loopback interfaces
RouterA(config-if)#ip address 172.16.1.1 255.255.0.0
RouterA(config-if)#ip address 172.16.1.2 255.255.0.0 secondary
```

The secondary address will act as a second host on the LAN.

```
RouterA(config-if)#ip nat inside « The inside NAT network
RouterA(config-if)# ^Z
RouterA#
```

Router B:

```
Router#config t
Router(config)#hostname RouterB
RouterB(config)#interface serial 0
RouterB(config-if)#ip address 192.168.1.2 255.255.255.252
RouterB(config-if)#no shutdown
RouterB(config-if)#exit
RouterB(config)#ip route 0.0.0.0 0.0.0.0 serial 0
RouterB(config)# ^Z
RouterB#
```

To set the clock rate on a serial interface (DCE connection only) you need to use the “clock rate #” command on the serial interface, where # indicates the speed:

```
RouterA(config-if)#clock rate 64000
```

Ping across the serial link now .

2. To set telnet access, you need to configure the VTY lines to allow telnet access. To do this, type (from configuration mode):

```
RouterA(config)#line vty 0 4 « Enters the VTY line configuration
```

```
RouterA(config-line)#login local « This will use local usernames
```

```
and passwords for telnet access
```

```
RouterA(config-line)#exit « Exit the VTY config mode
```

```
RouterA(config)#username banbury password ccna « Creates username
```

```
and password for telnet access (login local)
```

Router B:

```
RouterB(config)#line vty 0 4
```

```
RouterB(config-line)#login local
```

```
RouterB(config-line)#exit
```

```
RouterB(config)#username banbury password ccna
```

3. To set the “enable password”, do the following:

```
RouterA(config)#enable secret cisco « Sets the “enable password”
```

```
(encrypted)
```

Router B:

```
RouterB(config)#enable secret cisco
```

4. You need to configure a NAT pool and then tell the pool which access-list to access to determine what traffic you want to be NATted:

```
RouterA(config)#ip nat pool internet_out 10.0.0.1 10.0.0.10 prefixlength 24
```

(or you could have written “ip nat pool internet_out 10.0.0.1 10.0.0.10
netmask 255.255.255.0”)

```
RouterA(config)#ip nat inside source list 1 pool internet_out
```

```
RouterA(config)#access-list 1 permit 172.16.0.0 0.0.255.255
```

```
RouterA(config)# ^Z
```

5. To see if NAT is working, we need to turn on a debug with “debug ip nat”. Now imagine that the loopback address of 172.16.1.1 is a host on the LAN that wants to get out to the Internet. When the packet from the NATted LAN passes through the router, it will match the access-list and be translated to an address from the NAT pool.

```

RouterA#debug ip nat « Turn on the NAT debug
RouterA#ping
Protocol [ip]:
Target IP address: 192.168.1.2 « Ping router B
Repeat count [5]:
Datagram size [100]:
Timeout in seconds [2]:
Extended commands [n]: y
Source address or interface: loopback 0 « Source is the LAN
Type of service [0]:
Set DF bit in IP header? [no]:
Validate reply data? [no]:
Data pattern [0xABCD]:
Loose, Strict, Record, Timestamp, Verbose[none]:
Sweep range of sizes [n]:
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 40/40/40 ms
RouterA#
02:12:37: NAT: s=172.16.1.1->10.0.0.1, d=192.168.1.2 [20]
02:12:37: NAT*: s=192.168.1.2, d=10.0.0.1->172.16.1.1 [20]
02:12:37: NAT: s=172.16.1.1->10.0.0.1, d=192.168.1.2 [21]
02:12:37: NAT*: s=192.168.1.2, d=10.0.0.1->172.16.1.1 [21]
02:12:37: NAT: s=172.16.1.1->10.0.0.1, d=192.168.1.2 [22]
02:12:37: NAT*: s=192.168.1.2, d=10.0.0.1->172.16.1.1 [22]
02:12:37: NAT: s=172.16.1.1->10.0.0.1, d=192.168.1.2 [23]
02:12:37: NAT*: s=192.168.1.2, d=10.0.0.1->172.16.1.1 [23]
02:12:37: NAT: s=172.16.1.1->10.0.0.1, d=192.168.1.2 [24]
02:12:37: NAT*: s=192.168.1.2, d=10.0.0.1->172.16.1.1 [24]

RouterA#show ip nat translations

```

Pro	Inside global	Inside local	Outside local	Outside
-----	---------------	--------------	---------------	---------

global

--- 10.0.0.1 172.16.1.1 --- ---

RouterA#

You can see that the NAT debug shows the source (s=) as the loopback interface, which is translated to 10.0.0.1. The destination (d=) is the serial address for router B

192.168.1.2. The * shows the returning packet that is translated back.

The numbers in brackets [20, etc.] are the IP identification numbers of the packets.

If we want to check that the pool is allocating addresses correctly, we can source a second ping—this time from the secondary address. There should be another address allocated from the NAT pool.

RouterA#ping

Protocol [ip]:

Target IP address: 192.168.1.2

Repeat count [5]:

Datagram size [100]:

Timeout in seconds [2]:

Extended commands [n]: y

Source address or interface: 172.16.1.2

Type of service [0]:

Set DF bit in IP header? [no]:

Validate reply data? [no]:

Data pattern [0xABCD]:

Loose, Strict, Record, Timestamp, Verbose[none]:

Sweep range of sizes [n]:

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 192.168.1.2, timeout is 2 seconds:

!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 40/46/68 ms

RouterA#

04:09:23: NAT: s=172.16.1.2->10.0.0.2, d=192.168.1.2 [45]

04:09:23: NAT*: s=192.168.1.2, d=10.0.0.2->172.16.1.2 [45]

04:09:23: NAT: s=172.16.1.2->10.0.0.2, d=192.168.1.2 [46]

04:09:23: NAT*: s=192.168.1.2, d=10.0.0.2->172.16.1.2 [46]

```

04:09:23: NAT: s=172.16.1.2->10.0.0.2, d=192.168.1.2 [47]
04:09:23: NAT*: s=192.168.1.2, d=10.0.0.2->172.16.1.2 [47]
04:09:23: NAT: s=172.16.1.2->10.0.0.2, d=192.168.1.2 [48]
04:09:23: NAT*: s=192.168.1.2, d=10.0.0.2->172.16.1.2 [48]
04:09:23: NAT: s=172.16.1.2->10.0.0.2, d=192.168.1.2 [49]
04:09:23: NAT*: s=192.168.1.2, d=10.0.0.2->172.16.1.2 [49]

```

```
RouterA#show ip nat translations
```

Pro	Inside global	Inside local	Outside local	Outside global
---	10.0.0.1	172.16.1.1	---	---
---	10.0.0.2	172.16.1.2	---	---

6. Now please enter reload at the “Router#” prompt and type “yes” to confirm.

Show runs

```
RouterA#show run
```

```
Building configuration...
```

```
Current configuration : 749 bytes
```

```
!
```

```
version 12.1
```

```
no service single-slot-reload-enable
```

```
service timestamps debug uptime
```

```
service timestamps log uptime
```

```
no service password-encryption
```

```
!
```

```
hostname RouterA
```

```
!
```

```
ip subnet-zero
```

```
!
```

```
interface Loopback0
```

```
ip address 172.16.1.1 255.255.0.0
```

```
ip address 172.16.1.2 255.255.0.0 secondary
```

```
ip nat inside
```

```
!
```

```
interface Ethernet0
```

```
no ip address
```

```
shutdown
```

```
!  
interface Ethernet1  
  no ip address  
  shutdown  
!  
interface Serial0  
  ip address 192.168.1.1 255.255.255.252  
  clockrate 64000  
  ip nat outside  
!  
interface Serial1  
  no ip address  
  shutdown  
!  
ip nat pool internet_out 10.0.0.1 10.0.0.10 prefix-length 24  
ip nat inside source list 1 pool internet_out  
ip classless  
no ip http server  
!  
access-list 1 permit 172.16.0.0 0.0.255.255  
!  
line con 0  
line aux 0  
line vty 0 4  
!  
end
```

RouterA#

- - -

RouterB#show run

Building configuration...

Current configuration : 456 bytes

```
!  
version 12.2  
service timestamps debug uptime  
service timestamps log uptime  
no service password-encryption  
!  
hostname RouterB  
!  
ip subnet-zero  
!  
interface Serial0  
ip address 192.168.1.2 255.255.255.252  
!  
interface Serial1  
no ip address  
shutdown  
!  
interface TokenRing0  
no ip address  
shutdown  
!  
ip classless  
ip route 0.0.0.0 0.0.0.0 Serial 0  
no ip http server  
ip pim bidir-enable  
!  
line con 0  
line aux 0  
line vty 0 4  
!  
end
```

RouterB#



© 2006-2011 HowtoNetwork.net All Rights Reserved. Reproduction without permission prohibited.